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ABSTRACT

It appears that although women are not achieving the numbers in the doctoral fields that many think appropriate, their attrition rate in the educational system is generally going down, whereas that for men is generally going up. However, the employment picture for doctoral women does not appear to be generally improving. (Author)

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ATTRITION OF WOMEN IN GRADUATE SCHOOL -- MYTHS VERSUS REALITY

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EFFORTS TO CHANGE THE ETHNIC AND SEX COMPOSITION OF PROFESSIONAL AND SCIENTIFIC FIELDS APPEAR TO HAVE BEEN MEETING WITH MIXED SUCCESS. IF ONE WERE TO BELIEVE THE ANECDOTAL TALES ONE HEARS, ONE WOULD THINK THAT ATTRITION IN THE EDUCATIONAL PROCESS IS ONE OF THE BIGGEST PROBLEMS FACED IN THIS AREA. YET IF ONE LOOKS AT HARD DATA ON THE SUBJECT, ONE MAY BE SOMEWHAT SURPRISED AT THE FINDINGS.

WHAT I HAVE TO REPORT TODAY DEALS ONLY WITH THE EDUCATION AND SUBSEQUENT EMPLOYMENT DATA FOR THE SEXES. I DO NOT HAVE COMPARABLE DATA FOR MINORITIES. I APOLOGIZE IF I HAVE INCLUDED AN EXCESSIVE AMOUNT OF DATA, AND I WILL TRY TO KEEP THE PRESENTATION AS LUCID AS IS REASONABLE. IN ATTEMPTING THIS, I WILL NOT MENTION STATISTICAL SIGNIFICANCE. IN VIEW OF THE LARGE NUMBERS GENERALLY INVOLVED, THE RESULTS OF ANY HYPOTHESIS TEST I MENTION ARE SIGNIFICANT, USUALLY HIGHLY SIGNIFICANT.

FIRST, LET US LOOK AT DEGREE PRODUCTION. THE NUMBER OF DEGREES AWARDED IN ALL FIELDS, WITH ONE SMALL EXCEPTION, HAS INCREASED MONOTONICALLY FROM 1965 TO 1975. THE NUMBER OF BACHELOR'S DEGREES AWARDED PER YEAR HAS ALMOST DOUBLED, THOSE FOR MASTER'S AND PH.D.'S

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[1]THE AUTHOR IS INDEBTED TO DONALD ZINK FOR CONDUCTING THE STATISTICAL ANALYSES ON WHICH MUCH OF THE PAPER IS BASED. BASIC DATA WERE FROM THE NATIONAL CENTER FOR EDUCATIONAL STATISTICS AND THE NATIONAL SCIENCE FOUNDATION.

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HAVE MORE THAN DOUBLED. THE GREATEST PERCENTAGE INCREASE IS FOR THE MASTER'S DEGREE.

THE PERCENTAGE OF BACHELOR'S DEGREES AWARDED TO MEN HAS DECREASED FROM 57.2% IN 1965 TO 54.6% IN 1975. IN OTHER WORDS, WOMEN NOW OBTAIN NEARLY HALF OF THE BACHELOR'S DEGREES. A SIMILAR SITUATION OBTAINS RELATIVE TO THE MASTER'S DEGREE. WHEREAS 66.2% OF THOSE AWARDED MASTER'S DEGREES IN 1965 WERE MALE, IN 1975 ONLY 55.2% OF MASTER'S DEGREES WERE AWARDED TO MALES. RELATIVE TO PH.D. PRODUCTION, THERE IS A SLIGHTLY DIFFERENT PICTURE. IN 1965, 89.2% OF THE PH.D.'S WERE AWARDED TO MALES; HOWEVER, IN 1975, 77.1% WERE GIVEN TO MALES. THUS, ALTHOUGH PH.D. PRODUCTION FOR FEMALES IS IMPROVING, STILL A DISPROPORTIONATE NUMBER OF THOSE AWARDED THE DEGREE ARE MALE.

THE DATA MAY BE VIEWED A DIFFERENT WAY. THE PERCENTAGE OF FEMALE BACHELOR'S DEGREE RECEPIENTS HAS INCREASED 2.6% IN THE TEN-YEAR PERIOD; THE PERCENTAGE OF FEMALE MASTER'S RECIPIENTS HAS INCREASED 11.4%, AND DOCTORAL RECIPIENTS 11.8%. THUS, IT APPEARS THAT WOMEN ARE INCREASING THEIR SHARE OF THE ADVANCED DEGREE AWARDS.

DATA FROM THE FIELD OF PSYCHOLOGY MAY BE COMPARED WITH THE PREVIOUS DATA FOR ALL FIELDS. IN 1965, 59.0% OF THE BACHELOR'S RECIPIENTS WERE MALE; IN 1975 THIS PERCENTAGE WAS 47.3%. THUS, MORE THAN HALF OF THE RECENT BACHELOR'S RECIPIENTS IN PSYCHOLOGY ARE FEMALE. MALES REPRESENTED 67.3% OF THE MASTER'S IN PSYCHOLOGY AWARDED IN 1965. IN 1975, THEY ACCOUNTED FOR ONLY 57.1%. THIS SITUATION ESSENTIALLY PARALLELS THAT PREVIOUSLY INDICATED FOR MASTER'S IN ALL FIELDS. THE PRODUCTION OF FEMALE PH.D.'S HAS BEEN CONSISTENTLY HIGHER IN PSYCHOLOGY THAN IN ALL FIELDS TAKEN TOGETHER. IN 1965, MALES ACCOUNTED FOR 81.2% OF THE PRODUCTION AND IN 1975 ACCOUNTED FOR 69.1% OF THE PH.D.'S IN PSYCHOLOGY. THUS, OVER THE TEN-YEAR PERIOD

THE PERCENTAGE OF FEMALE BACHELOR'S RECIPIENTS HAS INCREASED 11.7%; MASTER'S FOR FEMALES HAVE INCREASED 10.2% AND THE FEMALE PH.D. PERCENTAGE HAS INCREASED 12.1%.

IN THE EXAMINATION OF THE DEGREE PRODUCTION DATA FOR MORE SPECIFIC INFORMATION ON ATTRITION, SOME RATHER ARBITRARY ASSUMPTIONS HAD TO BE MADE. SINCE IT WAS DESIRABLE TO COMPARE THE NUMBER OF DEGREE RECIPIENTS WITH THE NUMBER ELIGIBLE TO START WORK TOWARD THE DEGREE, IT WAS DECIDED TO OBTAIN THE PERCENTAGE DOCTORAL DEGREES AWARDED WERE OF THE NUMBER OF BACHELOR'S DEGREES AWARDED FIVE YEARS PREVIOUSLY. FOR EXAMPLE, 1970 DOCTORATES WERE INTERPRETED AS A PERCENTAGE OF 1965 BACHELOR'S AND 1971 DOCTORATES AS A PERCENTAGE OF 1966 BACHELORS.

FOR ALL FIELDS, DOCTORATES FOR BOTH SEXES HAVE DECREASED FROM 5.9% IN 1970 TO 4.3% IN 1975. THE CHANGE IN ATTRITION RATES FOR MEN IS MORE DRAMATIC. IN 1970, 8.9% OF THE MEN AWARDED BACHELOR'S DEGREES FIVE YEARS PREVIOUSLY WERE AWARDED PH.D.'S, BUT IN 1975 THIS PERCENTAGE WAS 5.9. THE ATTRITION RATE FOR WOMEN HAS ALWAYS BEEN HIGH; HOWEVER, FEMALE ATTRITION HAS BEEN DECREASING RATHER THAN INCREASING, AS SOME HAVE ASSUMED. IN 1970, 1.8% OF WOMEN AWARDED BACHELOR'S FIVE YEARS BEFORE COMPLETED THE DOCTORATE. IN 1975, THIS PERCENTAGE HAS RISEN TO 2.1. IN THE FIELD OF PSYCHOLOGY, A SIMILAR SITUATION PREVAILS. FOR BOTH SEXES, ATTRITION APPEARS TO BE INCREASING. IN 1970, THE PSYCHOLOGY DOCTORATE PRODUCTION RATE BASED ON BACHELOR'S IN ALL FIELDS FIVE YEARS PREVIOUSLY WAS .33%. THE CORRESPONDING PERCENTAGE FOR 1975 WAS .31%. FOR MALES, THE PERCENTAGE DROPPED FROM .44% IN 1970 TO .37% IN 1975. FOR FEMALES, AGAIN, THE PERCENTAGE INCREASED. IT WAS .17% IN 1970

AND .22% IN 1975. THUS, IN PSYCHOLOGY AS WELL AS OTHER FIELDS, IT APPEARS THAT FEMALE ATTRITION IS DIMINISHING.

AGAIN MAKING AN ARBITRARY ASSUMPTION, THE DOCTORATE PRODUCTION RATE WAS CALCULATED AS A PERCENTAGE OF MASTER'S DEGREE PRODUCTION TWO YEARS EARLIER. IN ALL FIELDS IN 1967, THE PERCENTAGE FOR BOTH SEXES WAS 17.6%. IN 1975 THIS PERCENTAGE WAS 12.9. FOR MEN IN 1967, THE PERCENTAGE WAS 23.4. THIS DROPPED TO 17.3 IN 1975. THE WOMEN'S PERCENTAGES FOR ALL FIELDS INCREASED SLIGHTLY MOVING FROM 6.2% OF THE PREVIOUS MASTER'S IN 1967 TO 6.6% IN 1975.

IN PSYCHOLOGY, THE DOCTORATE PRODUCTION WAS COMPARED TO PSYCHOLOGY MASTER'S PRODUCTION TWO YEARS PREVIOUSLY. FOR BOTH SEXES, ATTRITION IN PSYCHOLOGY IS ALSO ON AN INCREASE. IN 1967, 54.9% OBTAINED DOCTORATES. IN 1975, ONLY 41.9% OBTAINED THE ADVANCED DEGREE. THIS DECREASE, AGAIN IS MAINLY ATTRIBUTABLE TO MEN. IN 1967, 66.2% OF THE MASTER'S DEGREE MEN OBTAINED THE DOCTORATE, WHEREAS IN 1975 ONLY 48.3% COMPLETED THE PH.D. THE RATE FOR WOMEN HAS ESSENTIALLY REMAINED CONSTANT OVER THE NINE-YEAR PERIOD. IT WAS 31.7 IN 1967 AND 32.2 IN 1975. THE DIFFERENCE WAS NOT SIGNIFICANT.

IN EXAMINING ATTRITION BEFORE THE MASTER'S LEVEL, AGAIN, AN ARBITRARY BASE OF BACHELOR'S DEGREE TWO YEARS EARLIER WAS USED. IT APPEARS THAT MASTER'S PRODUCTION AS A FUNCTION OF PREVIOUS BACHELOR'S PRODUCTION IS GOING UP. FOR BOTH SEXES IN 1967, MASTER'S WERE PRODUCED AT 30.9% OF THE BACHELOR'S RATE; IN 1975, THE PERCENTAGE WAS 31.6. THIS IS TAKING PLACE IN FACE OF AN APPARENT INCREASE IN MALE ATTRITION. IN 1967, 35.3% OF BACHELOR'S DEGREE

MALES WERE AWARDED MASTERS, BUT ONLY 31.1% ACHIEVED THE MASTER'S IN 1975. ON THE OTHER HAND, THE PERCENTAGES FOR WOMEN ARE GOING UP. IN 1967, THE PERCENTAGE OF MASTER'S FOR WOMEN WAS 25.1, AND IN 1975, THE CORRESPONDING PERCENTAGE WAS 32.2. THIS PERCENTAGE INCIDENTALLY IS SIGNIFICANTLY HIGHER THAN THE 31.1 PERCENTAGE FOR MALES IN 1975. THUS, IT APPEARS THAT IN AT LEAST ONE YEAR, THE FEMALE ATTRITION RATE WAS LOWER THAN THAT FOR MALES.

IN PSYCHOLOGY, OF NECESSITY THE BASE FOR DETERMINING ATTRITION BEFORE THE MASTER'S, WAS BACHELOR'S IN ALL FIELDS TWO YEARS EARLIER. AGAIN, MASTER'S PRODUCTION HAS APPARENTLY GONE UP FOR BOTH SEXES. IN 1967 THE RATE WAS .62%; IN 1975 THE RATE WAS .76%. FOR MEN, THERE IS AN INCREASE FROM .71% TO .78%. FOR WOMEN, THERE IS A MORE DRAMATIC INCREASE FROM .49% TO .75%. THE 1975 DIFFERENCE BETWEEN MEN AND WOMEN IS NOT SIGNIFICANT.

IN SUMMARIZING THE DATA PRESENTED THUS FAR, IT APPEARS THAT THE FOLLOWING GENERALIZATIONS MAY BE MADE:

1. IN ALL FIELDS, BOTH AT THE DOCTORAL AND THE MASTER'S LEVEL, MALE ATTRITION APPEARS TO BE GOING UP.
2. IN PSYCHOLOGY, MALE ATTRITION IS GOING UP AT THE DOCTORAL LEVEL, BUT GOING DOWN AT THE MASTER'S LEVEL.
3. FEMALE ATTRITION, WITH THE EXCEPTION OF THE PRODUCTION OF DOCTORS FROM MASTERS IN PSYCHOLOGY, IS GOING DOWN.
4. DESPITE FAVORABLE TRENDS IN ATTRITION, THE PRODUCTION OF FEMALES AT THE DOCTORAL LEVEL IS WELL BELOW THAT OF MEN, THE DOCTORATES IN ALL FIELDS IN 1975, BEING MORE THAN 77% MALE.
5. PRODUCTION RATES FOR MASTERS BACHELOR'S ARE LESS DISSIMILAR. HERE ABOUT 55% OF THOSE AWARDED DEGREES IN 1975 WERE MALE.

THERE ARE ANY NUMBER OF POSSIBLE INTERPRETATIONS WHICH CAN BE PLACED UPON THESE DATA. MANY OF THEM WOULD BE SPECULATIVE AND THE SOURCE OF NEEDLESS CONTROVERSY. IN LOOKING AT THE TOTAL PICUTRE, IT MIGHT BE ADVISABLE TO EXAMINE THE EMPLOYMENT SITUATION. HERE WE MAY FIND SOME TENUOUS CONNECTIONS, FOR IT APPEARS THAT THERE ARE ALSO MYTHS ABOUT THE EMPLOYMENT OPPORTUNITIES FOR WOMEN AT THE DOCTORAL LEVEL.

THE POPULATION OF DOCTORAL SCIENTISTS AND ENGINEERS GREW FROM 245,000 IN 1973 TO 278,000 IN 1975 -- A 13 PERCENT INCREASE. DURING THIS PERIOD, THE NUMBER OF WOMEN HOLDING PH.D.'S IN SCIENCE AND ENGINEERING INCREASED AT A FASTER RATE (23 PERCENT) THEN MEN (12 PERCENT). ALSO BETWEEN 1973 AND 1975 THE NUMBER OF EMPLOYED WOMEN SHOWED AN INCREASE OF 29 PERCENT, OVER TWICE THE INCREASE OF MEN.

HOWEVER, THE NUMBER OF WOMAN DOCTORAL SCIENTISTS REMAINS EXCEEDINGLY LOW. IN 1975 THERE WERE APPROXIMATELY 251,000 MALES IN THIS AREA AND ONLY 26,000 FEMALES, LESS THAN 10 PERCENT OF THE TOTAL. THE PERCENTAGE OF FEMALES IN 1973 WAS 8.7 PERCENT. IN 1975, 96.2 PERCENT OF THE MEN WERE PARTICIPANTS IN THE LABOR FORCE, BUT ONLY 88.6% OF THE WOMEN WERE SO PARTICIPATING. THE INCREASE IN FEMALE PARTICIPATION SINCE 1973 WAS GREATER THAN THAT FOR MALES. IN 1973, 94.5 PERCENT OF THE MALES WERE LABOR FORCE PARTICIPANTS AS OPPOSED TO 84.9 PERCENT OF THE FEMALES.

ANOTHER INTERESTING FACT RELATIVE TO THE EMPLOYMENT OF WOMEN DOCTORATES IS THAT THE SALARIES OF WOMEN RELATIVE TO MEN DID NOT INCREASE FROM 1973 TO 1975. DURING THIS PERIOD THE MEDIAN ANNUAL SALARY OF MEN (IN CURRENT DOLLARS) ROSE FROM $21,200 TO $23,500, AN INCREASE OF 11 PERCENT. DURING THE SAME PERIOD WOMEN'S SALARIES ROSE FROM A MEDIAN LEVEL OF $17,600 IN 1973 TO $19,000 IN 1975, AN

INCREASE OF 8 PERCENT. AS A RESULT, WOMEN'S SALARIES CONTINUED TO LAG BEHIND THOSE OF MEN, AND IN FACT, THE OVERALL NUMERICAL DIFFERENCE INCREASED FROM $3,600 PER YEAR IN 1973 TO $4,500 PER YEAR IN 1975. BUT ALTHOUGH MEN'S SALARIES EXCEEDED THOSE OF WOMEN IN ALL AGE GROUPS, FURTHER STUDY REVEALS THAT BETWEEN 1973 AND 1975 THE RATIO OF MEN'S TO WOMEN'S SALARIES NARROWED SLIGHTLY IN ALL AGE GROUPS BELOW 55 EXCEPT FOR THE 35 TO 39 AGE GROUP.

THE SMALLEST PERCENTAGE DIFFERENCE BETWEEN MEN AND WOMEN IS IN THE UNDER 30 GROUP FOR WHOM THE MEDIAN SALARY FOR MEN IS $17,200 AND THAT FOR WOMEN IS $15,900. HERE, THE RATIO OF MEN'S TO WOMEN'S SALARIES WAS 1.08 IN 1975. THIS MAY BE CONTRASTED WITH RATIOS GENERALL BETWEEN 1.25 AND 1.30 FOR THOSE IN THE OVER-40 AGE RANGE.

THUS, IT APPEARS THAT THE FINANCIAL INCENTIVES FOR WOMEN TO COMPLETE THE PH.D. ARE NO BETTER THAN THEY WERE IN THE PAST. ALTHOUGH ENTRY SALARIES ARE SOMEWHAT HIGHER, AS INDICATED BY THE LOWERING OF THE MALE TO FEMALE RATIO OF SALARIES FOR THE BELOW 30 GROUP BETWEEN 1973 AND 1975 FROM 1.11 TO 1.08, WOMEN STILL APPEAR TO BE DISCRIMINATED AGAINST INSOFAR AS SALARY INCREASES ARE CONCERNED. IT SHOULD BE NOTED THAT THESE DATA, BASED UPON ALL DOCTORAL SCIENTISTS AND ENGINEERS ARE NOT ENTIRELY CLEAR. FOR EXAMPLE, IN 1975, ENGINEERS ACCOUNTED FOR 18 PERCENT OF THE EMPLOYED MALE TOTAL AS COMPARED WITH SLIGHTLY MORE THAN 1 PERCENT OF THE FEMALE TOTAL. ON THE OTHER HAND, 29 PERCENT OF ALL EMPLOYED WOMEN WERE PSYCHOLOGISTS, 3 TIMES THE RATIO OF EMPLOYED MEN. HOWEVER, THE MEDIAN SALARY FOR ENGINEERS IN 1975 WAS $25,200 AND THAT FOR PSYCHOLOGISTS WAS $22,100.

ANOTHER PLAUSIBLE EXPLANATION IS THAT MEN AND WOMEN, NOT NECESSARILY BY CHOICE, WORK IN DIFFERENT TYPES OF ORGANIZATION. FOR EXAMPL

70% OF THE WOMEN ARE EMPLOYED IN EDUCATIONAL INSTITUTIONS AND ONLY 10% ARE EMPLOYED IN BUSINESS AND INDUSTRY. FOR MEN, 57% WORKED IN EDUCATIONAL INSTITUTIONS AND 27% WORKED IN BUSINESS AND INDUSTRY. THE MEDIAN SALARY IN EDUCATIONAL INSTITUTIONS IN 1975 WAS $21,400 WHEREAS THAT IN BUSINESS AND INDUSTRY WAS $26,000.

IT ALSO APPEARS THAT THERE ARE SEX DIFFERENCES IN THE PERCENTAGES UNEMPLOYED AND SEEKING EMPLOYMENT. IN 1975 THIS UNEMPLOYMENT RATE WAS 0.9 PERCENT FOR MEN AND 2.6 PERCENT FOR WOMEN DOCTORATES. THUS, WE HAVE ANOTHER POTENTIAL DISINCENTIVE FOR WOMEN TO COMPLETE DOCTORAL TRAINING.

AS FAR AS PSYCHOLOGY IS CONCERNED, THE EMPLOYMENT PICTURE IS SOMEWHAT BRIGHTER FOR WOMEN THAN IN OTHER FIELDS. THE MEDIAN 1975 SALARY FOR MALE PSYCHOLOGISTS WAS $22,700 AND THAT FOR WOMEN WAS $19,600. THE MALE FEMALE RATIO OF SALARIES WAS 1.16, WHEREAS IN ENGINEERING IT WAS 1.21 AND IN COMPUTER SCIENCES IT WAS 1.31.

BOTH MALE AND FEMALE PSYCHOLOGISTS HAVE MORE FAVORABLE UNEMPLOYMENT RATES THAN SCIENTISTS AND ENGINEERS AS A WHOLE. THE RATE FOR MALE PSYCHOLOGISTS IN 1975 WAS 0.7% AND THAT FOR FEMALES WAS 1.5%. AGAIN, HOWEVER, IT APPEARS THAT THE UNEMPLOYMENT RATE FOR WOMEN IS GROSSLY DISPROPORTIONATE.

THUS, DESPITE THE TALES OF ISOLATED WOMEN GAINING EXOTIC JOBS COMMANDING HIGH SALARIES, IT APPEARS THAT WOMEN IN GENERAL STILL LAG BEHIND, AND MAY BE PROGRESSIVELY LAGGING EVEN FARTHER BEHIND MEN IN EMPLOYMENT IN SCIENTIFIC FIELDS. EVEN IN THE FIELD OF PSYCHOLOGY, WHICH HAS THE REPUTATION OF BEING MORE PROGRESSIVE THAN THE HARDER SCIENCES, WOMEN COMMAND LOWER SALARIES THAN MEN AND HAVE AN UNEMPLOYMENT RATE DOUBLE THAT OF MEN.

In conclusion, it appears that although women are not achieving the numbers in the doctoral fields that many of us think appropriate, their attrition rate in the educational system is generally going down, whereas that for men is generally going up. However, the employment picture for doctoral women does not appear to be generally improving.

A final word might be said about trends, we have estimated that in 1985 49.1% of the bachelor's will be awarded to women; 49.5% of the master's and 33.3% of the doctorates recipients will be women. We project that academic attrition will continue to increase for men and decrease for women. If conditions in the marketplace do not change, what can we tell female graduate students about their futures? Although the marketplace may be forced to change as more women become active in scientific and professional fields, and it is well worthwhile to encourage more women into the pipeline, it appears that we must concentrate on changing the conditions under which women are employed and compensated.